

SEQUENCE LISTING

<110> HOSHINO, Tatsuo

OJIMA, Kazuyuki

SETOGUCHI, Yutaka

<120> PROCESS FOR THE MANUFACTURE OF CAROTENOIDS AND  
BIOLOGICALLY USEFUL MATERIALS THEREOF

<130> C38435/111694

<140> 09/727,855

<141> 2000-12-01

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<170> PatentIn version 3.1

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<213> Phaffia rhodozyma

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Ala Pro Ala Ala Phe Gln Ile Arg Ala Lys His Thr Leu Pro Glu Leu  
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cct tac gct tac gat gcc ctg gag ccc tcc atc tcc aag gag atc atg 144  
Pro Tyr Ala Tyr Asp Ala Leu Glu Pro Ser Ile Ser Lys Glu Ile Met  
35 40 45

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Thr Leu His His Thr Lys His His Gln Thr Tyr Val Asn Gly Leu Asn  
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Ala Ala Glu Glu Ser Tyr Ser Ala Ala Val Gly Lys Glu Asp Val Leu  
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<213> Phaffia rhodozyma

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35 40 45

Thr Leu His His Thr Lys His His Gln Thr Tyr Val Asn Gly Leu Asn  
50 55 60

Ala Ala Glu Glu Ser Tyr Ser Ala Ala Val Gly Lys Glu Asp Val Leu  
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Thr Gln Val Lys Leu Gln Ser Ala Leu Lys Phe Asn Gly Gly Gly His

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90

95

Ile Asn His Ser Leu Phe Trp Lys Asn Leu Ala Pro Tyr Gly Ser Glu  
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Glu Ala Thr Leu Ser Glu Gly Pro Leu Lys Lys Ala Ile Glu Glu Ser  
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Ala Val Gln Gly Ser Gly Trp Gly Trp Leu Gly Leu Asn Pro Leu Thr  
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Lys Lys Leu Glu Val Thr Thr Thr Ala Asn Gln Asp Pro Leu Leu Thr  
165 170 175

His Ile Pro Ile Ile Gly Val Asp Ile Trp Glu His Ala Phe Tyr Leu  
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Gln Tyr Lys Asn Val Lys Pro Asp Tyr Leu Ala Ala Val Trp Ser Val  
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Glu Pro Tyr Ile Ser Lys Glu Ile Met Ile Leu His His Ser Lys His  
20 25 30

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His Gln Thr Tyr Val Thr Asn Leu Asn Ala Ala Ile Gln Ala Phe Ser  
35 40 45

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Gln Thr Asn Asp Ile Lys Ala Gln Ile Ala Leu Gln Ser Ala Leu Lys  
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ttc aac gga gga gga cac atc aac cac tcc ctc ttc tgg aag aac atg 240  
Phe Asn Gly Gly Gly His Ile Asn His Ser Leu Phe Trp Lys Asn Met  
65 70 75 80

gct cct gcc gac tct gct gat gcc aag ctc acc gag gga tcg ctc aag 288  
Ala Pro Ala Asp Ser Ala Asp Ala Lys Leu Thr Glu Gly Ser Leu Lys  
85 90 95

act gcc atc gac aag gac ttt gga tcc ttc gag gag ttc aag aag aag 336  
Thr Ala Ile Asp Lys Asp Phe Gly Ser Phe Glu Glu Phe Lys Lys Lys  
100 105 110

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130

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 165 170 175

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&lt;213&gt; Phaffia rhodozyma

&lt;400&gt; 7

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 35 40 45

Gln Thr Asn Asp Ile Lys Ala Gln Ile Ala Leu Gln Ser Ala Leu Lys  
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Phe Asn Gly Gly Gly His Ile Asn His Ser Leu Phe Trp Lys Asn Met  
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Thr Ala Ile Asp Lys Asp Phe Gly Ser Phe Glu Glu Phe Lys Lys Lys  
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Phe Asn Thr Ala Thr Leu Gly Val Gln Gly Ser Gly Trp Gly Trp Leu  
                  115                120                125

Gly Tyr Asn Thr Ala Thr Lys His Leu Glu Ile Ala Thr Thr Ala Asn  
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Gln Asp Pro Leu Ile Thr Leu Thr Pro Ile Ile Gly Leu Asp Ile Trp  
145                150                155                160

Glu His Ala Phe Tyr Leu Gln Tyr Lys Asn Val Lys Pro Asp Tyr Leu  
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Val Lys Thr Ser Glu Gly Asn Trp Asp Phe Val Gly Asn Asn Thr Pro  
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35 40 45

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Phe Ser Asp Arg Gly Thr Pro Ala Ser Tyr Arg His Met His Gly Tyr  
85 90 95

tct gga cac acc ttc aag atg gtc aac agg aac ggt gac tgg aat tat 336  
Ser Gly His Thr Phe Lys Met Val Asn Arg Asn Gly Asp Trp Asn Tyr  
100 105 110

gtc cag att cac atg cgc acc gat cag ggt gtc aag act cac acc aat 384  
Val Gln Ile His Met Arg Thr Asp Gln Gly Val Lys Thr His Thr Asn  
115 120 125

gaa gag gct tgc aaa ctc gac gcc tcc aat ccc gat tca aac gga gac 432  
Glu Glu Ala Ser Lys Leu Asp Ala Ser Asn Pro Asp Ser Asn Gly Asp  
130 135 140

gac ttg ttc gac gca atc aag aat gga gac ttc cct agc tgg acg gtt 480  
Asp Leu Phe Asp Ala Ile Lys Asn Gly Asp Phe Pro Ser Trp Thr Val  
145 150 155 160

cag gta cag gta atg tct cct gag cag gcc cag aag ttc aga tac aac 528  
Gln Val Gln Val Met Ser Pro Glu Gln Ala Gln Lys Phe Arg Tyr Asn  
165 170 175

att ctg gat ctc acc aag gtc tgg tcc cac aag gag ttc cca ctt agg 576  
Ile Leu Asp Leu Thr Lys Val Trp Ser His Lys Glu Phe Pro Leu Arg  
180 185 190

acg att gga aag ttc act ttg aac cga aac gtg gat aac tat ttc gca 624  
Thr Ile Gly Lys Phe Thr Leu Asn Arg Asn Val Asp Asn Tyr Phe Ala  
195 200 205

gag gtt gaa cag ctc gcc ttt gct cct tcc cat ctg cct cct gga atc 672  
Glu Val Glu Gln Leu Ala Phe Ala Pro Ser His Leu Pro Pro Gly Ile  
210 215 220

gag ccc tgc aac gat ccc gtc ctt cag gct cga cta ttc tcc 714  
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<212> PRT

<213> Phaffia rhodozyma

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Ser Gly Ser Ser Asp Thr Ala Arg Asp Pro Arg Gly Phe Ser Leu Lys  
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Val Lys Thr Ser Glu Gly Asn Trp Asp Phe Val Gly Asn Asn Thr Pro  
20 25 30

Ile Phe Phe Leu Arg Asp Pro Ala Lys Phe Pro Ile Phe Ile His Thr  
35 40 45

Gln Lys Arg Asn Pro Gln Thr Asn Ser Lys Asp Lys Asp Ala Phe Trp  
50 55 60

Asp Tyr Leu Ser Gln Asn Pro Glu Ser Val His Gln Val Leu His Leu  
65 70 75 80

Phe Ser Asp Arg Gly Thr Pro Ala Ser Tyr Arg His Met His Gly Tyr  
85 90 95

Ser Gly His Thr Phe Lys Met Val Asn Arg Asn Gly Asp Trp Asn Tyr  
100 105 110

Val Gln Ile His Met Arg Thr Asp Gln Gly Val Lys Thr His Thr Asn  
115 120 125

Glu Glu Ala Ser Lys Leu Asp Ala Ser Asn Pro Asp Ser Asn Gly Asp  
130 135 140

Asp Leu Phe Asp Ala Ile Lys Asn Gly Asp Phe Pro Ser Trp Thr Val  
145 150 155 160

Gln Val Gln Val Met Ser Pro Glu Gln Ala Gln Lys Phe Arg Tyr Asn  
165 170 175

Ile Leu Asp Leu Thr Lys Val Trp Ser His Lys Glu Phe Pro Leu Arg  
180 185 190

Thr Ile Gly Lys Phe Thr Leu Asn Arg Asn Val Asp Asn Tyr Phe Ala  
195 200 205

Glu Val Glu Gln Leu Ala Phe Ala Pro Ser His Leu Pro Pro Gly Ile  
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